

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 10/050,573
Attorney Docket No.: Q66582

REMARKS

Claims 1-17 are all the claims pending in the application. By this Amendment, Applicant amends claims 1, 5, and 6. The amendment to claim 1 is made for reasons of precision of language and consistency, and does not narrow the literal scope of the claims and thus do not implicate an estoppel in the application of the doctrine of equivalents. Claims 5 and 6 are amended to further define the invention.

In addition, by this Amendment, Applicant adds claims 13-17. Claims 13-17 are clearly supported throughout the specification.

I. Summary of the Office Action

The Examiner objected to claim 1. The Examiner withdrew the previous rejections. The Examiner, however, found new ground for rejecting the claims.

II. Objection to the claim

The Examiner objected to claim 1 for a minor informality. Applicant respectfully requests the withdrawal of this objection in view of a self-explanatory amendment to claim 1.

III. Prior Art Rejections

Claims 1, 2, and 5-7 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,274,476 to Lee (hereinafter "Lee") and claims 3, 4, and 8-12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,337,713 to Sato (hereinafter "Sato") in view of U.S. Patent No. 6,331,873 to Burke et al. (hereinafter "Burke"). Applicant respectfully traverses these rejections in view of the following comments.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 10/050,573
Attorney Docket No.: Q66582

Claim Rejections under 35 U.S.C. § 102

Claims 1, 2, and 5-7 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,274,476 to Lee (hereinafter “Lee”). Applicant respectfully traverses.

To be an “anticipation” rejection under 35 U.S.C. § 102, the reference must teach every element and recitation of the Applicant’s claims. Rejections under 35 U.S.C. § 102 are proper only when the claimed subject matter is identically disclosed or described in the prior art. Thus, the reference must clearly and unequivocally disclose every element and recitation of the claimed invention.

The Examiner contends that Lee suggests each feature of independent claims 1 and 2. This rejection is not supportable for at least the following reason. Claims 1 and 2 are the only independent claims. Claim 1 recites: “the charges being generated and stored in the plurality of light receiving units having received light; and transferring and outputting the moved charges along the charge transfer paths disposed on both sides of the plurality of light receiving units, wherein each of the plurality of light receiving units is connected to a light receiving path on each side to permit the charges to exit from both sides of the light receiving units” and claim 2 recites: “a plurality of charge transfer paths disposed on both sides of said plurality of light receiving units for receiving the charges exiting from said plurality of light receiving units and for transferring and outputting the received charges.”

Lee discloses a CCD image sensor having a plurality of VCCDs each formed in a zig-zag pattern in a vertical direction and a plurality of groups of first to fourth photodiodes. Lee, however, only discloses conventional photodiodes. That is, in Lee, each photodiode only has one exit through which the charges are transferred (Figs. 5 and 6; *see* Abstract, col. 4, lines 7 to

AMENDMENT UNDER 37 C.F.R. § 1.111

U.S. Appln. No. 10/050,573

Attorney Docket No.: Q66582

31 and col. 5, line 41 to col. 6, line 2). The Examiner alleges that a pair of photodiodes of Lee disclose a light receiving unit, as set forth in claims 1 and 2 (*see* page 3 of the Office Action). Lee, however, does not disclose that a pair of photodiodes that are back-to-back to each other form a light receiving unit. That is, Lee does not disclose or suggest each of the light receiving units being connected to a light receiving path on each side to permit the charges to exit from both sides of the light receiving units. In fact, in Lee, each photodiode is a single conventional light receiving unit that accumulates charges and transmits the charges via one exit (Fig. 5).

Indeed, Lee fails to disclose that a pair of photodiodes form a light receiving unit. Accordingly, the rejection is improper as it lacks “sufficient specificity” required under 102. “[A]nticipation under § 102 can be found only when the reference discloses exactly what is claimed and that where there are differences between the reference disclosure and the claim, the rejection must be based on § 103 which takes differences into account.” *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985); MPEP § 2131.

In summary, the deficiencies of the Lee reference fall to the Examiner’s burden to show inherent inclusion of the claim elements. Therefore, for all the above reasons, independent claims 1 and 2 are patentable. Claims 5-7 are patentable at least by virtue of their dependency on claim 1 or 2.

In addition, dependent claims 5 and 6 further recite: “wherein each light receiving unit is a single, integrally formed, storage container for storing the generated charges.” The pair of photodiodes as disclosed in Lee are not an integral single storage unit but two separated storage

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 10/050,573
Attorney Docket No.: Q66582

components (Fig. 5). For at least this additional reason, claims 5 and 6 patentably distinguish from Lee.

Claim Rejections under 35 U.S.C. § 103

Claims 3, 4, and 8-12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,337,713 to Sato (hereinafter "Sato") in view of U.S. Patent No. 6,331,873 to Burke et al. (hereinafter "Burke"). Applicant respectfully traverses this rejection in view of the following comments.

Of these rejected claims, only claim 3 is independent. Independent claim 3 requires: "a plurality of charge transfer paths disposed on both sides of said plurality of light receiving units for receiving the charges exiting from said plurality of light receiving units and for transferring and outputting the received charges." At least these unique features are not taught or suggested by the combined teachings of Sato and Burke.

The Examiner's position can be summarized as follows. The Examiner alleges that Sato discloses the sections A, B, C, D, of CCD (alleged light receiving units) and each section A, B, C, D has a number of CCD elements (alleged segments), *see* pages 5-6 of the Office Action. The Examiner further alleges that Sato's horizontal transfer paths 126A-D disclose the transfer paths as set forth in claim 3. The Examiner acknowledges that Sato does not disclose these CCD elements (alleged segments) being separated by a potential barrier. The Examiner, however, alleges that Burke discloses the barrier region (alleged potential barrier). The Examiner further alleges that one of ordinary skill in the art would have been motivated to combine the barrier region of Burke with Sato's CCD to separate the elements (alleged segments) and to prevent

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 10/050,573
Attorney Docket No.: Q66582

blooming between the elements (*see* page 6 of the Office Action). Applicant respectfully disagrees.

It is respectfully noted that there is no motivation to combine the references in the manner suggested by the Examiner. If, as alleged by the Examiner, the CCD elements of Sato disclose the segments set forth in claim 3, then one of ordinary skill in the art would not have been motivated to combine Burke's barrier region with the segments of Sato. That is, in Sato, each CCD element includes a photodiode and represents a pixel signal (col. 1, lines 23 to 35 and col. 6, lines 48 to 59). However, as is depicted in Fig. 2 of Sato, for example, each CCD element is already separate. That is, each CCD element forms a separate container for storing charges for a pixel. Accordingly, there is no need for the barrier, as disclosed in Burke. Accordingly, one of ordinary skill in the art would not have been motivated to include the barrier of Burke to separate the photodiodes.

Moreover, Sato only discloses four horizontal paths 126A-126D (Fig. 2). However, these horizontal transfer paths are not disposed on both sides of each CCD section. That is, in Sato, each section A, B, C, and D has only one transfer path 126A, B, C, and D, respectively (see Fig. 3 and col. 7, lines 1 to 20). In other words, in Sato, each section has only one transfer path on one side. Sato fails to disclose or suggest a plurality of charge transfer paths disposed on both sides of said plurality of light receiving units for receiving the charges exiting from said plurality of light receiving units and for transferring and outputting the received charges. In Sato, each transfer path receives charges from only one CCD section. Burke does not cure this deficiency of Sato.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 10/050,573
Attorney Docket No.: Q66582

In short, together, the combined teachings of these references would not have (and could not have) led the artisan of ordinary skill to have achieved the subject matter of claim 3.

Accordingly, claim 3 is patentable over the combined teachings of Sato and Burke. Claims 4 and 8-12 are patentable at least by virtue of their dependency on claim 3.

In addition, dependent claim 4 recites: "wherein the plurality of segments are four segments obtained by separating each of said plurality of light receiving units with a cruciform potential barrier." The Examiner alleges that Sato discloses these unique features of claim 4 (see page 6 of the Office Action). However, Sato simply discloses a number of photodiodes and fails to teach or suggest a cruciform potential barrier. Burke does not cure the deficient teachings of Sato. Burke's barrier region (e.g., see Fig. 2) could at most form two separate areas. In Burke, however, there is no disclosure or suggestion of the cruciform potential barrier. That is, the combined teachings of Sato and Burke do not disclose or suggest a cruciform potential barrier, as set forth in claim 4. For at least this additional reason, claim 4 is patentable over the combined teachings of these references.

In addition, dependent claim 11 recites "the segments separated by the potential barrier are triangularly shaped" and dependent claim 12 recites "the potential barrier diagonally divides a light receiving unit from the plurality of light receiving units into segments." The Examiner alleges that if one is to view Sato from a 45 degree angle, then the line between photodiodes 11 and 1 and the line between photodiodes 11 and 12 disclose the segments being triangular and the potential barrier diagonally dividing the light receiving unit (*see* page 12 of the Office Action). Applicant respectfully disagrees.

AMENDMENT UNDER 37 C.F.R. § 1.111

U.S. Appln. No. 10/050,573

Attorney Docket No.: Q66582

As is clearly visible from Fig. 2 of Sato, the photodiodes (alleged segments) are arranged in a grid-like structure i.e. a 10 by 10 matrix (col. 6, lines 23 to 33). That is, looking at the photodiodes 1-100, at any angle, a formation of a grid-like structure with the photodiodes being squares is observed. Accordingly, Sato does not disclose or suggest the photodiodes being triangularly shaped. Moreover, Sato fails to disclose a barrier (as acknowledged by the Examiner with respect to claim 3) and Burke only discloses a barrier that can allegedly divide the photodiodes at a straight line. There is no disclosure or suggestion that Burke's barrier can divide the photodiodes diagonally.

For at least these additional reasons, claims 11 and 12 are patentable over Sato in view of Burke.

New Claims

In order to provide more varied protection, Applicant adds claims 13-17. Claims 13-17 are patentable at least by virtue of their dependency on claims 1-3.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly invited to contact the undersigned attorney at the telephone number listed below.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 10/050,573
Attorney Docket No.: Q66582

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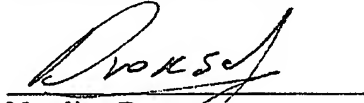
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Date: January 13, 2006

Attorney Docket No.: Q66582